GUIDELINES FOR WRITING THE NUTRIENT MANAGEMENT COMPONENT OF A CHESAPEAKE BAY PRESERVATION ACT SOIL & WATER QUALITY CONSERVATION PLAN

A nutrient management plan is written to indicate how primary nutrients (Nitrogen, Phosphorous and Potassium) are to be managed on agricultural lands in ways which protect groundwater and surface water from excessive nutrient enrichment. Nutrient management plans contain operating procedures based on expected crop yield, existing nutrient levels in the soil, organic residuals, optimum timing and placement of nutrients, environmental resource protection, and agronomic practices such as liming, tillage and crop rotation.

ALL NUTRIENT MANAGEMENT PLANS MUST MEET THE STANDARDS AND CRITERIA CONTAINED IN VIRGINIA'S NUTRIENT MANAGEMENT TRAINING & CERTIFICATION REGULATIONS -- 4 VAC 5-15-10 et seq. These guidelines are a tool to assist planners with developing the nutrient management component of a Chesapeake Bay Preservation Act Soil & Water Quality Conservation Plan in accordance with the plan content and development standards and criteria found in the Nutrient Management Training and Certification Regulations, 4 VAC 5-15-10 et seq. (regardless of whether the planner is certified or not).

BELOW IS A SYNOPSIS OF THE INFORMATION THAT NUTRIENT MANAGEMENT PLANS MUST CONTAIN:

I. PLAN IDENTIFICATION (this can be in narrative and cover sheet form):

- Farmer/Operator name and address;
- County and Watershed code of land under the nutrient management plan;
- Total acreage covered under the plan with double cropped acreage accounted for only once;
- Acreage of cropland, hay, pasture and speciality crops included in the plan for the first year of the plan;
- Date the plan was prepared or revised;
- Length of time the plan addresses (1 to 5 years); and
- Type and approximate number of livestock, if applicable;
- Name/Title/Address/Phone Number of plan writer; and
- Narrative that describes the operation and how to use the nutrient management plan

II. MAP OR AERIAL PHOTOGRAPH:

- Each plan shall contain a map or aerial photograph to identify:
  - The tract location and boundaries;
  - Individual field boundaries; and
  - Field numbers and acreage.
- The map or aerial photograph shall be legible, with environmentally sensitive features clearly depicted. A farm sketch should be developed when a map or aerial photograph is unavailable.
- Soil maps and appropriate legends

III. REFERENCES AND RECOMMENDATIONS (Balance Sheet) SHALL INCLUDE:

- Name of farmer/operator;
- Field identification numbers to include FSA Tract and Field Numbers;
- Field acreage;
- Expected crops or crop rotations:
  - Obtain the appropriate crop or crop rotation information (by field) from the farmer during the initial interview.
  - The first crop listed on the nutrient balance sheet should be the crop that the planner anticipates will receive the first nutrient application(s) post farmer receipt of the plan. For example, if a plan is written in June for a corn field, then the plan would begin with the next crop, e.g. wheat.
  - All crops in the rotation should be listed in sequential form on the nutrient balance sheet, with appropriate nutrient needs and recommendations;
- Crop nutrient needs per acre based on soil analysis results and soil productivity;
- Legume nitrogen credits per acre;
- Organic (biosolids or manure) nutrient application rates in tons per acre or 1,000 gallons per acre; and plant available nitrogen as N, phosphorus as P_2O_5, and potassium as K_2O per acre; and spreading schedule to include approximate months of application;
- Expected days for incorporation of organic nutrient sources into the soil if organic sources will be used;
- Commercial fertilizer rates and timing of applications, including split applications of nitrogen and the possible use of soil nitrogen test results on a field before sidedressing with nitrogen;
- Liming recommendations if pH is below the optimal range;
- The nutrient management planner should incorporate additional plan requirements as appropriate if required by other specific regulatory or incentive programs which apply to a specific operator.

IV. NUTRIENT APPLICATIONS:

A nutrient management planner shall include in each plan:

- Nutrient application practices for each field in the plan;
- Nutrient application rates shall be calculated for nitrogen (N), phosphate (P_2O_5) and potash (K_2O);
- Consideration for nutrients contained in fertilizers, manure, biosolids, legumes in the crop rotation, crop residues, residual nutrients and all other sources of nutrients;
- If similar, individual fields may be grouped together. Similar fields would be fields which: share the same predominant soil type, have similar soil test levels and pH, are in the same crop and have the same environmentally sensitive features.

V. NUTRIENT APPLICATION RATES:

- Determination of nutrient needs shall be consistent with tables and procedures contained in the VA Nutrient Management Training & Certification Regulations (4 VAC 5-15-10 et seq.) and Standards and Criteria, the VA DCR Nutrient Management Handbook and the Commercial Vegetable Production Recommendations (VCES Publication 456-420).
- Crop nutrient needs **shall be based on soil test results** for P_2O_5 and K_2O.

SOIL TESTS:

- Recommendations **must** be made based on soil tests (that are less than 3 years old at the time the plan is written).
- Soil tests must be able to be correlated to Virginia Tech's Mehlick I phosphorus (A & L Labs, Brookside Labs - see Table 2/2A page 33 **VA NUTRIENT MANAGEMENT STANDARDS AND CRITERIA (revised November, 1995)**

- Soil test levels shall be based on Table 2, page 32, **VA NUTRIENT MANAGEMENT STANDARDS AND CRITERIA (revised November, 1995)**
- Representative soil samples may be acceptable provided they represent no more than 40 acres (crop land) and 60 acres (hay/pasture land)

  Definition of **representative soil sample**: a soil test (less than 3 years old at the time the plan is written) which represents the **AVERAGE** soil properties of a field/fields. Fields may be represented by 1 soil sample (if the total acreage is less than 40 acres cropland or 60 acres hay/pasture land) providing that:

  - the fields are in the same crop rotation,
  - fields have similar characteristics (soil type/liming history/fertilizer application history)
  - the sample has been taken from a representative portion of the acreage (not a problem area)
  - the fields are in the same and/or adjoining tract(s)
  - the farmer agrees to the soil test representation for more than 1 field

- Expected crop yield shall be determined from **past crop yields or soil productivity** on a given field. The farmer's past experience with crop yields in specific fields may be used to make reasonable adjustments to expected yields in lieu of verifiable yield records provided the upward adjustments impact no more than 20% if the fields on a particular farm.

  - The calculation of expected yield shall:

    - Producer records - average of the 3 highest yields achieved over the last 5 years the particular crop was grown in the field. Find the corresponding soil productivity group and expected yield that most closely matches the yield. **or**

    - Be based on, and consistent with, soil productivity information contained in the VA Nutrient Management Training & Certification Regulations (4 VAC 5-15-10 et seq.) and Standards and Criteria or the VA DCR Nutrient Management Handbook.

      SOIL PRODUCTIVITY/EXPECTED YIELD (by crop) INFORMATION: (page 4 & Table 1-1, VA NUTRIENT MANAGEMENT STANDARDS AND CRITERIA (revised November, 1995)

      Expected Yields for a field may be determined one of the following ways:

      - Weighted average of productivity of all soils in a field, or

      - Predominant soil in a field - must comprise 50% or more of a field, or

ADDITIONS OR SUBTRACTIONS TO EXPECTED YIELDS: (page 25, Table 1-4, VA NUTRIENT MANAGEMENT STANDARDS AND CRITERIA (revised November, 1995)

- If using soil productivity, yields should be:

- increased if field is irrigated (Table 1-3, page 24)

- increased if field has been artificially drained (either by subsurface " tile" drainage or ditches)

- C decreased if field has severe erosion, slope, coarse texture or rock outcrops
- C decreased if farmer has no desire to achieve expected yields

- Recommended application rates for **potassium**, secondary nutrients and micronutrients should be at agronomically or economically justifiable levels for expected crop production. Agronomic rates are recommendations supplied by VA Tech based on current soil test levels. Economically justifiable rates are rates that the farmer and planner agree upon based on past yield history and past diagnosed deficiencies.

- **NITROGEN CREDIT FROM PREVIOUS LEGUME CROPS:**

  - C If a legume crop (such as soybeans or crimson clover) was the crop preceding the corn crop, nitrogen credits shall be calculated (Table 4, page 54) **VA NUTRIENT MANAGEMENT STANDARDS AND CRITERIA (revised November, 1995)**
  - C Total nitrogen needs required for the corn crop will be reduced by the amount of legume credit given.

  EXAMPLE: Kempsville soil requires 120 to 140 lbs. Nitrogen. 140 pounds nitrogen MINUS 20 lbs. nitrogen credit from the previous soybean crop = 120 pounds commercial nitrogen recommended **for the corn.**

- **NUTRIENT AVAILABILITY FROM BIOSOLIDS OR MANURES (Table 5-1 through 5-8 and Table 6-1, pages 55-64), VA NUTRIENT MANAGEMENT STANDARDS AND CRITERIA (revised November, 1995):**

  - C Credits must be given for BOTH the nutrients available to the first crop after manure or biosolids are applied, AND either residual nutrients (if frequent application sites) or mineralization of nutrients after the application.

VI. NUTRIENT APPLICATION TIMING:

- Recommendations pertaining to the timing of nutrient applications shall be as close to plant nutrient uptake periods as reasonably possible.
- Recommendations for split applications of inorganic nitrogen fertilizers shall be made as starter or broadcast, sidedress or topdress in row crops and small grains consistent with procedures in the VA Nutrient Management Training & Certification Regulations (4 VAC 5-15-10 et seq.) and Standards and Criteria or the VA DCR Nutrient Management Handbook.
- **Split applications** will be recommended on fields with a leaching index or 10 or above and on all environmentally sensitive areas as defined in the VA Nutrient Management Training & Certification Regulations (4 VAC 5-15-10 et seq.) and Standards and Criteria (definitions).

  SOIL NITRATE LEACHING INDEX: (page 26 & Table 1-5, VA NUTRIENT MANAGEMENT STANDARDS AND CRITERIA (revised November, 1995)

  - C Use hydrologic soil group: A, B, C, or D (find this in the soil survey table for each county)
  - C Look up the county in which the field is located
  - C Correlate leaching letter to leaching number
  - C Determine the leaching index for the field (low/moderate/high/very high)

  RECOMMEND SPLIT APPLICATIONS BASED ON LEACHING INDEX (all fields should have splits recommended, but they should be required when):

- Soils have an index of high or very high in order to reduce the potential of nitrate leaching (sidedress/two topdress applications, etc.)

SOILS WHICH HAVE BEEN **ARTIFICIALLY DRAINED**:

- Fields which have been artificially drained (either by ditches or drain tile) have a much greater potential for nitrogen leaving the field with the drained water. Split applications should always be recommended in this situation.

- Split applications of nitrogen will be made on fields that are irrigated. These recommendations should coincide with irrigation scheduling.
- Nutrient applications to frozen or snow covered ground should be avoided.

- **DEFINITION OF STANDARD AND INTENSIVE WHEAT AND BARLEY:**

  - Standard wheat and barley is defined as one (1) topdress application in the spring
  - Intensive wheat or barley is defined as two (2) topdress applications in the spring based on tiller counts at growth stage 25 (tillering) and tissue tests at growth stage 30 (just prior to jointing)

- **NITROGEN NEEDS OF CORN BASED ON VALUES:**

  - Find expected yield and related productivity class using one of the methods listed previously
  - Using Table 3 (page 34) in **VA NUTRIENT MANAGEMENT STANDARDS AND CRITERIA (revised November, 1995)** find the range in which the nitrogen recommendation falls:

    EXAMPLE: Kempsville soil, productivity IIIa, N range = 120 to 140 pounds/acre

- **RECOMMENDING FERTILIZER APPLICATION SPLITS ON A CORN CROP:**
  Fertilizer for a corn crop will be recommended using one or more of the following application methods, the rate per/acre for each application method used, should be listed individually on the balance sheet; total nutrients applied cannot exceed nutrient needs:

  - **Starter** (banded) at planting - if used by farmer, is the placement of fertilizer two inches to the side and two inches below the seed, total plant food for this application should not exceed 60 lbs of nitrogen plus potash, as crop injury may occur above this rate.
  - **Broadcast** (pre-emergence) - uniform application of material over a field, usually before crop has emerged or shortly thereafter. the recommendation shall be reflected on the nutrient balance sheet
  - **Broadcast with pre-emergence herbicides** - uniform of material over a field, using water or liquid nitrogen as a carrier to apply the herbicides.
  - **Sidedress** nitrogen - placement of fertilizer between rows of a crop, after the crop has emerged, the rate usually represents the majority of total recommended nitrogen.

VI. NUTRIENT BALANCE SHEETS SHOULD INCLUDE:

- FSA Tract and Field Numbers, FSA Field Acreage, Operators Field/Tract Identification
- Farmer/Operation Name/Date Plan Written or Revised
- Crop Rotation (for the length of plan - usually 3 years)

- Nutrient Needs (based on soil test and soil productivity or yield records)
- Nitrogen credit for legumes in rotation (soybeans/clover/alfalfa, etc.)
- Nutrient credits for manure or biosolid applications
- Residual nitrogen that will become available from manures/biosolids after first year
- Nutrient recommendations (for each crop throughout the length of the plan (usually 3 years)
- Appropriate nitrogen application splits (broadcast, starter, topdress or sidedress) and their timings for application for each crop listed (timing may be listed in a footnote)
- Appropriate footnotes (listed on each balance sheet) that more specifically define the recommendations
- Appropriate recommendations (totals of P & K required) for double cropped rotations AT THE TIME THEY SHOULD BE APPLIED.

VII. PLAN MAINTENANCE AND REVISIONS:

- A site-specific nutrient management plan shall specify the length of the plan (from 1 to 5 years). Plans developed for a period of time greater than 3 years and up to 5 years should be limited to sites in pasture or hay crops.
- The plan shall indicate a need for modification if cropping systems, rotations, fields, animal numbers, animal type or management are changed, added, or removed.
- Soil analysis shall be recommended for each field at least every 3 years to determine the soil fertility and pH and to update the nutrient management plan.
- Modified topdressing or sidedressing application rates of nitrogen may be recommended if a pre-sidedress nitrogen test (corn) or tissue test (small grain) administered during the growing season indicates different levels of nitrogen than are listed in the plan.